A wireless inductive-capacitive (L-C) sensor for rotating component temperature monitoring

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Abstract- Temperature monitoring is critical in almost every type of machinery and application, especially in rotating components such as jet turbines, engines, and power plants, etc. These components involve harsh environments and where the physical connections for monitoring systems are impossible. This paper presents a resonant inductive-capacitive (L-C) circuit based wireless temperature sensor suitable for working in these harsh environments to monitor the temperature of rotating components. Design and performance analysis of the wireless temperature sensor has been conducted and the sensor prototype was successfully fabricated and calibrated up to 200ºC with sensitivity of 30 kHz/ºC. As a result it is confirmed that temperature monitoring of a rotating component can be carried out without requiring physical connection, power supplies or active elements in the sensor circuit.

Index terms: Wireless, resonant inductive-capacitive (L-C) circuit, temperature sensor, rotating components.